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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 31.13.76281	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP 02/02788	International filing date *(day/month/year)* 13.03.2002	Priority date *(day/month/year)* 13.03.2002
International Patent Classification (IPC) or both national classification and IPC G01B5/08		
Applicant BOREALIS TECHNOLOGY OY et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
07.10.2003	15.07.2004
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Arca, G Telephone No. +31 70 340-2773

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 02/02788

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-10 as originally filed

Claims, Numbers

1-12 received on 07.06.2004 with letter of 07.06.2004

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-12
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-12
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-12
	No:	Claims	

2. Citations and explanations

   see separate sheet

1. Reference is made to the following documents:

   D1: US-A-4 240 206 (BARESH JOSEPH M ET AL) 23 December 1980
   D2: US-A-5 335 422 (FERGUSON CLAYTON L) 9 August 1994

2.1 Claims 11 and 12 do not meet the requirements of Article 6 PCT for the following reasons:

2.2 Although claims 1 and 11 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to further limitative features (eg detector means being moveable in the radial direction of the pipe) introduced in claim 11 and in respect of the terminology used for the features of that subject-matter (eg guide(s) vs. guide assembly). The aforementioned claims therefore lack conciseness.

2.3 Claim 12 concerns a method of measuring the deformation of the surface of a pipe. A reference to the apparatus "as claimed in any preceding claim" leaves the reader in doubt as to the scope of the claim. The features essential to the definition of an invention regarding a method are the physical steps to be undertaken to carry out the method itself.
Independent claim 12 does not contain any physical steps at all and therefore it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

3. NOVELTY

3.1 The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses a measuring head (12) for determining the diameter and the ovality of a pipe (col. 1, lines 29-39). The head (12) comprises two probes (48a, 48b), which are guided along the longitudinal direction of the pipe (col. 3, lines 30-47) by a pair of anvils (42a, 42b) and rollers (46a, 46b).

3.2 The invention in the application in suit differs from the measuring head of D1 for the relative positions of the rotatable members and the detector: the distance between each rotatable member and the detector is smaller than the radius of the arc formed by these elements of the measuring head.

3.3 The subject-matter of claim 1 therefore is new and satisfies the criteria set forth in Article 33(2) PCT.

3.4 The subject-matter of claim 12, for so far as it can be understood (see clarity objection above), is not anticipated by D1. In fact, claim 12 concerns the method of using the device of claim 1 (or any of the other dependent claims). For this reason, the subject-matter of claim 12 is new and satisfies the criteria set forth in Article 33(2) PCT.

3.5 The subject-matter of claims 2-11 is likewise new and satisfies the criteria set forth in Article 33(2) PCT.

4. INVENTIVE STEP

4.1 The problem to be solved by the present invention may be regarded as to quickly and accurately positioning the measuring head on the pipe under test.

4.2 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:
the device in D1 requires the operator to go through the lengthy preparatory process of opening the anvil (42a, 42b), introducing the pipe into the open space and finally closing the anvil. The solution put forward by the applicant consists in having rotatable members and detector forming an angle smaller than 180°, so that the measuring head (comprising the rotatable members and the detector itself) can simply and directly be placed onto the pipe to be tested.

4.3 This solution is not anticipated by any of the documents in the search report. In particular, document D2 employs a similar "closed anvil" configuration as D1.

4.4 Claims 2-11 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to inventive step.

5. INDUSTRIAL APPLICABILITY

The subject-matter of the claims is considered to be industrial applicable and these claims therefore fulfill the requirements of Article 33(4) PCT.

Claims

1. An apparatus for measuring deformation of a surface of a pipe comprising a detector capable of directly detecting changes in the radius of a pipe and a plurality of guides for guiding the detector along the pipe in a direction parallel to the longitudinal axis of the pipe, the guides comprising rotatable members spaced apart from the detector and arranged to contact a surface of the pipe when the detector is in contact with the pipe, wherein a said guide is provided on each side of the detector, the rotatable members of the guides and the detector being positioned substantially along an arc, and the distance between each said rotatable member of the guide and the detector being smaller than the radius of the arc, whereby an output related to the deformation of the pipe surface is derived from the output of the detector.

2. An apparatus as claimed in claim 1, wherein the detector is arranged to measure the distance between a region of the pipe adjacent the detector and a part of the apparatus.

3. An apparatus as claimed in claim 2, wherein the detector is arranged to be placed in contact with the surface of the pipe and is moveable in the radial direction of the pipe such that the deformation of the pipe surface may be determined from the displacement of the detector.

4. An apparatus as claimed in claim 1, 2 or 3, wherein the guide(s) comprise magnet(s) arranged to hold the apparatus in position against a steel pipe.

5. An apparatus as claimed in any preceding claim, wherein the detector comprises a rotatable member that is arranged to roll over

the surface of the pipe.

6. An apparatus as claimed in claim 5, wherein the rotatable member of the detector is movably mounted on a housing and each guide member is mounted on an arm extending laterally from the housing.

7. An apparatus as claimed in claim 5 or 6 comprising measurement means for measuring the displacement of the rotatable member of the detector in relation to the housing.

8. An apparatus as claimed in any preceding claim wherein said apparatus further comprises transporting means to transport the detector means along the pipe.

9. An apparatus as claimed in any preceding claim, arranged to measure the distance traveled by the apparatus along the pipe.

10. An apparatus as claimed in claim 9, wherein the distance traveled is determined by measuring the number of rotations of a rotatable member engaged with the pipe.

11. An apparatus for detecting deformation of a surface of a pipe comprising:

(i) a detector capable of detecting changes in the radius of a pipe when placed in contact with the surface of the pipe, said detector means being moveable in the radial direction of the pipe at the point of contact;

(ii) a guide assembly capable of guiding the detector along the surface of the pipe in a direction parallel with the longitudinal axis of the pipe, wherein the guide assembly comprises rotatable members provided on each side of the detector being positioned substantially along an arc, the distance between each

said rotatable member of the guide and the detector being smaller than the radius of the arc; and

(iii) measurement means capable of measuring the radial displacement of the detector, whereby to produce an output related to the deformation of the pipe surface.

12. A method of measuring the deformation of surface of a pipe using the apparatus as claimed in any preceding claim.